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# CROSSROADS

Economics, Policy, and the  
Future of Grizzly Bears in British Columbia



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Preparation of this report drew on the input and insights of many people. Zane Parker of Integral Economics was the primary author while Rob Gorter provided the economic framework and analysis. Sarah Pullman was the principal research assistant and also provided editing services. Donna Morton, the Executive Director of Integral Economics and Chris Genovali, the Executive Director of Raincoast, both provided insights, contacts, and review. Many other people contributed valuable review and comment including Clive Chapple, Dominique Collin, and Alan Dolan.

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**RAINCOAST CONSERVATION SOCIETY** is a non-profit research and public education organization. We work in partnership with scientists, First Nations, local communities and non-governmental organizations to build support for decisions that protect marine and rainforest habitat on British Columbia's central and north coast.

**THE CENTRE FOR INTEGRAL ECONOMICS** is a non-profit, non-partisan charitable organization based in British Columbia. Integral Economics works to promote innovative, market-based solutions that reconcile economic prosperity, social justice, and environmental integrity.

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## Executive Summary

This report brings together a wide range of information from a variety of sources in order to present a picture of a particular component of BC's economy. The information and analysis relate to revenue figures for those industries relying on the presence of grizzly bears: grizzly hunting (as a component of guide outfitting) and grizzly viewing (as a component of ecotourism). The key findings are summarized below.

BC currently receives considerably greater economic benefits—in terms of revenue—from viewing grizzly bears than from hunting them. For ecotourism operations involving grizzly viewing, total revenues directly attributable to the presence of grizzlies are approximately \$6.1 million annually. Guide outfitting operations with a grizzly hunt component, in comparison, generate about \$3.3 million dollars from grizzly hunting activities. Projecting current revenues into the future 20 years and calculating the present value of these revenue streams, we determine that the grizzly viewing industry is valued at over \$75 million and grizzly hunting at just over \$40 million.

An ongoing sport hunt could have a negative impact on the overall economic activity attributable to the presence of grizzly bears in BC. We come to this conclusion by looking at two potential scenarios and projecting these into the future. In the first scenario we consider the economic impacts of a possible decline in the grizzly bear population. While it is impossible to make precise economic projections given the lack of reliable grizzly population data, we could expect a long-term decline in revenues from both the hunting and viewing industries.

Looking at another scenario we find that an immediate moratorium on hunting would also result in a short-term economic loss to the province. Under a moratorium, the entire revenue stream that could be expected from hunting would be lost. It is quite likely, however, that a moratorium on the sport hunt, in conjunction with some concerted efforts to promote BC as a ecotourism destination, would lead to growth of the grizzly viewing industry. In fact, an annual growth rate of about 4% in grizzly viewing revenues over the next 20 years would offset all losses to guide outfitters offering grizzly hunting. If such growth directly resulted from a moratorium on the sport hunt, then this would be an economically prudent management decision.

With regard to grizzly bear management options, the revenue analysis suggests that it would be wise to proceed cautiously and not to jeopardize the large and potentially sustainable industry growing up around ecotourism and grizzly viewing for the smaller and potentially less sustainable business of grizzly bear sport hunting. Apart from other important considerations that pertain to grizzly bear management, our analysis shows that in the long term, it makes more economic sense to shoot grizzly bears with cameras than to shoot them with guns. Over the course of its lifetime, a grizzly bear can be viewed and photographed hundreds of times, generating tremendous economic wealth for BC. But a grizzly bear can only be shot once.

## Introduction

This report fills a gap in the information available to decision makers and the public about the management of the grizzly bear population in British Columbia. To date, much of the debate around grizzly bears has focused on the sport hunt and related biological and ethical issues. While these are critical matters that require more study and discussion, the economic component of grizzly bear management has been largely overlooked or limited to anecdotal evidence and selective statistics.

This report considers the type and scale of economic activity generated around grizzly bears in BC. By collating and analyzing these data, the report provides an economic overview to support an informed policy debate and decision-making process for grizzly bear management in the province. While economic consideration, such as presented here, should not be the final arbiter of wildlife management decisions, it is important for the decision-making process to be informed by a balanced understanding of economic outcomes. The economic impact of various management options can then be anticipated and planned for. If need be, economic transition or mitigation can be better planned with a fuller understanding of the affected industries.

The report first considers a simple question that has never been answered in the debate around grizzly management: what is the size and composition of economic activity directly attributable to the grizzly bear population in BC?

To answer this question we look at the two principal industries that rely on the presence and the abundance of the resident bear population: the guide outfitting/bear hunt operators and the ecotourism/bear viewing operators. *(See Appendix B—Industry Overviews for more details on each.)* To make informed decisions about grizzly bear management, it is important to understand each industry and its economic contribution to the province. This information can, in turn, inform a discussion of the trade-offs that must be made in any management scenario for grizzly bears in BC.

The second question looks toward the future of the bear hunting and viewing industries. Given the current status of economic activity related to grizzly bears in the province, we look at two scenarios based on- potential management options and population trends. While it is impossible to predict the precise outcomes of myriad economic and environmental forces, it is reasonable and necessary to make informed projections and scenarios based on current and emerging information. Consideration of these possible futures can again help decision makers as they grapple with complex political, social, and economic trade-offs.

# Key Findings

The following tables and discussion present the key findings from our survey and analysis of grizzly bear related industries in BC. The data were collated from a number of sources, including provincial records, industry associations, business advertising, and a broad survey of ecotourism operators. (See Appendix A for a more detailed overview of methodology and assumptions.)

## SNAPSHOT: CURRENT ECONOMIC STATUS OF GRIZZLY BEAR RELATED INDUSTRIES IN BC

When considering the implications of grizzly bear management options, it is valuable to first understand the current economic context. That is to say, what are the provincial revenue contributions attributable to grizzly bear guide outfitting and viewing operations?

The following table summarizes this information:

TABLE 1 Current Annual Revenues by Industry Sector

	AVERAGE ANNUAL REVENUES
Grizzly Viewing Ecotourism	\$6,100,000
Grizzly Hunting Guide Outfitters	\$3,300,000
<b>Total</b>	<b>\$9,400,000</b>

Based on these data, we can see that BC currently receives considerably greater revenue from viewing grizzly bears than from hunting them.

The sport hunt of grizzly bears generates just over \$3 million each year, including direct economic revenue to guide outfitters and royalties paid to the province.

In comparison, revenues generated by grizzly bear viewing activities total just over \$6 million. In other words, looking at grizzlies and taking their photo contributes about twice as much to BC's economic activity, in terms of revenue.<sup>1</sup>

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*BC currently receives considerably greater revenue from viewing grizzly bears than from hunting them.*

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<sup>1</sup> Future analysis could also consider economic contribution, in terms of employment, for grizzly bear related industries in BC. While we were able to calculate that approximately 80 full time equivalent jobs can be directly attributed to the grizzly bear viewing industry, we were unable to obtain enough information from the guide outfitting industry to make a fair comparison.



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*Net contributions of the grizzly hunt to BC's economy would also likely be lower than indicated if it were possible to calculate the negative impact on the tourism industry of the grizzly bear sport hunt.*

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When comparing revenue figures for each industry, it should be noted that the overall value of grizzly bears to the ecotourism industry is greater than indicated. The results shown here only account for the revenue generated by operators offering grizzly viewing tours. Many ecotourism and adventure tourism operators who do not specifically offer grizzly tours—and are therefore not included in these results—note that the possibility of seeing a grizzly bear attracts customers and is good for their business. Additionally, our figures do not account for viewing and related economic activities that occur outside of official tour operations.

Hunting grizzlies, on the other hand, is a very defined activity limited to those with a license, and the revenue attributable to the hunt is therefore limited to the amount shown. In other words, the figures given for the ecotourism industry represent a more conservative estimate than do the guide outfitting figures.<sup>2</sup> Moreover, net contributions of the grizzly hunt to BC's economy would also likely be lower than indicated if it were possible to calculate the negative impact on the tourism industry of the grizzly bear sport hunt.

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<sup>2</sup> While we do not calculate secondary economic impacts (i.e. revenues from equipment sales, transportation, accommodation, etc.) such research would contribute to a more detailed understanding of the scale and range of benefits to the province and to communities for each of the industries discussed here.

**LOOKING AHEAD: THE  
FUTURE OF GRIZZLY BEAR  
RELATED INDUSTRIES IN  
BC**

Having established the current status of revenue for each industry, we can look toward the future and make some projections based on various assumptions.

First, assuming that the current management scenario were maintained, that guide outfitters were able to maintain their historic level of grizzly bear hunting, and that there was no growth in either ecotourism or guide outfitting, what would be the overall value of each industry to the province? We calculate these figures by projecting the current annual revenues (Table 1) 20 years into the future and determining the present value of this revenue stream.<sup>3</sup>

**TABLE 2 Present Value of Average Revenues Over 20 Years<sup>4</sup>**

	AVERAGE REVENUES	
	Present Value (20 years)	Levelized Annual
Grizzly Viewing Ecotourism	\$75,700,000	\$6,100,000
Grizzly Hunting Guide Outfitters	\$40,600,000	\$3,300,000
<b>Total</b>	<b>\$116,300,000</b>	<b>\$9,400,000</b>

The present value figures presented here highlight the fact that management decisions made today have very large effects when one considers the stream of impacts into the future, even with a relatively short time horizon of 20 years.

<sup>3</sup> Present values are calculated using a 5% discount rate: see Appendix A for further discussion.

<sup>4</sup> Levelized annual values are uniform annual future values that, when discounted, have the same present value as a stream of actual “lumpy” or unequal future values.

## IMPLICATIONS OF A DECLINING GRIZZLY POPULATION

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*A conservative management approach would consider the prospect of a decline in the grizzly bear population and take steps to avoid any irreversible harm to the population.*

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The ability of the guide outfitters and tour operators to maintain revenue into the future is, of course, based on maintaining a healthy grizzly bear population. While the issue requires more study, there are experienced independent biologists who are skeptical that the province is capable of reliably estimating bear population size; a decline in the grizzly population is a real possibility when population estimates are unreliable.<sup>5</sup>

When considering grizzly bear management it is important to understand and anticipate the longer-term impacts of a potential decline in the grizzly population on relevant industries. In the absence of a consensus on population trends, a conservative management approach would consider the prospect of a decline in the grizzly bear population and take steps to avoid any irreversible harm to the population.

An independent scientific study, commissioned by the BC government's Grizzly Bear Science Panel, calculated an average 50% probability of an unacceptable population decline (defined as greater than 20% over 30 years) given the current grizzly hunt quotas.<sup>6</sup>

If grizzlies become increasingly rare, opportunities for bear viewing and related economic activities will gradually decline.

While it is possible to maintain some level of revenue and employment under a declining grizzly population scenario in the relative short term, the long-term prospects for sustained economic development will be constrained or foreclosed.

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<sup>5</sup> In December 2001, a group of 68 professional biologists concerned about the grizzly bear population sent a petition to the government calling for an immediate 5-10 year moratorium on the sport hunt and a temporary halt to road building in grizzly habitat.

<sup>6</sup> McLoughlin, 2002.

## REVENUE PROJECTIONS UNDER A SPORT HUNT MORATORIUM SCENARIO

Having considered the economic implications of the status quo management regime under both a stable and a declining grizzly bear population, we now turn to a management option advocated by some biologists, environmental organizations, and members of the public: a moratorium on sport hunting.

TABLE 3 Revenue Figures Under Moratorium Scenario

	AVERAGE REVENUES	
	Present Value (20 years)	Levelized Annual
Grizzly Viewing Ecotourism	\$75,700,000	\$6,100,000
Grizzly Hunting Guide Outfitters	\$0	\$0
<b>Total</b>	<b>\$75,700,000</b>	<b>\$6,100,000</b>

In this table we assume a scenario where a full moratorium on the sport hunting of grizzly bears is introduced immediately. Under this scenario, the revenues generated by the grizzly hunt are lost. Again we assume that the ecotourism operators maintain their current revenues over the 20-year time horizon but experience no growth, resulting in a present value of about \$76 million. While the short-term total revenues in this scenario are likely lower than would occur under a scenario of declining grizzly population, it is important to note that revenues from grizzly viewing would likely be increasing under a moratorium scenario. Under a declining population scenario, however, revenues from both industries would likely be declining and may eventually disappear.

## OFFSETTING REVENUE LOSS FROM GRIZZLY SPORT HUNT

The above projections have all assumed no growth in the grizzly bear viewing component of the ecotourism industry in BC. This is an unlikely assumption given that tourism, and ecotourism specifically, is one of the fastest growing industries in the province.<sup>7</sup> What's more, the potential for growth in ecotourism activities such as grizzly viewing could greatly increase given a concerted provincial effort to promote BC as a prime destination for such activities.

<sup>7</sup> Province of British Columbia, 2000.

The following table considers the growth in grizzly viewing activities that would be required to completely offset losses in revenue from a moratorium on the sport hunt over a 20-year time horizon.<sup>8</sup>

TABLE 4 Annual Growth in Grizzly viewing Ecotourism Revenues to Offset Guide Outfitter 20-Year Revenue Loss

	TIME HORIZON OVER WHICH REVENUES OFFSET		
	5 years	10 years	20 years
Annual Growth Rate required (% / year)	9.1%	5.4%	4%

*Anecdotal evidence from several bear viewing operators suggests that, with a moratorium in place, the potential for growth in the industry would be significantly improved.*

As these figures demonstrate, even over a relatively short period of five years, a strong growth rate in grizzly viewing activities of 9.1% could entirely offset the revenue losses over 20 years that would be experienced under a grizzly sport hunt moratorium. If the grizzly viewing industry continues to grow beyond the five-year period, then the province would generate more revenue than it would have with an ongoing sport hunt and no growth in viewing-related activities. Alternatively, a modest growth rate of 4% over a 20-year time horizon would also offset revenue lost as a result of a moratorium on the sport hunt.

It is impossible to predict exactly what effect a moratorium on the grizzly sport hunt would have on the potential for ecotourism grizzly viewing activities. However, anecdotal evidence from several bear viewing operators suggests that, with a moratorium in place, the potential for growth in the industry would be significantly improved.<sup>9</sup> If, over a 20-year time horizon, a 4% growth in the grizzly viewing industry were to result directly from the introduction of a sport hunt moratorium, then we could say this would be an economically prudent decision, leaving aside any arguments for a moratorium related to population biology or ethical considerations.

<sup>8</sup> The ecological impacts and limits to viewing grizzly bears need to be monitored and taken into account under any scenario anticipating growth in the industry.

<sup>9</sup> This based on the brief grizzly sport hunt moratorium introduced in 2000 and the subsequent increase in bookings for some operators. Conversely, operators noted a decline and some cancellations in bookings following the reintroduction of the sport hunt.

# Economic Issues and Implications

The first part of this report has presented economic data, analysis, and projections based on grizzly bear viewing and hunting operations in BC. This final section presents some economic insights related to, but not necessarily directly arising from, the analytical work above.

## THE COSTS OF GOOD MANAGEMENT

A decline in BC's grizzly bear population, as discussed above, would have negative impacts on the long-term viability of both the grizzly hunting and grizzly viewing industries. Given the uncertainty involved and the very real possibility of a decline in the bear population, the conservative management decision would be to limit or end the grizzly sport hunt and do whatever is possible to ensure the continuation and growth of the larger grizzly viewing/ecotourism sector.

An alternative option to ensure that the grizzly population is managed in a sustainable manner would be to undertake the research needed to accurately assess and monitor the size of the grizzly population. However, this option is likely prohibitive from an economic standpoint. A recent science panel study commissioned by the current provincial government points out that, "Even more difficult is managing harvests near the maximum sustained yield, because of the increased risk of over-harvest. In this case, very reliable habitat and demographic information is needed to ensure long-term conservation. For rare and wide-ranging species like grizzly bears, obtaining such information is exceedingly costly."<sup>10</sup> And, as the report goes on to point out, "Animals like grizzly bears, which occur at low densities with low reproductive rates, support a low rate of harvesting, so any size harvest is bound to be close to MSY."<sup>11</sup>

The science panel report surveys a number of techniques for estimating grizzly populations and concludes that, in fact, "Techniques to estimate the abundance of bears are typically imprecise, expensive and time-consuming."<sup>12</sup> One study in the United States, using a DNA sampling

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<sup>10</sup> Province of British Columbia, 2003, p.13

<sup>11</sup> Ibid, p.29.

<sup>12</sup> Ibid, p.9.

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*In the absence of thorough population research, it is impossible for wildlife managers to ensure that the grizzly hunt is truly sustainable.*

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technique, was applied in the Northern Continental Divide Ecosystem (24,800 km<sup>2</sup>) at a cost of approximately \$4 million (\$CDN).<sup>13</sup> Given that the area in BC with grizzly bears is approximately 30 times larger than the area of the US study, the cost of obtaining this level of information would be around \$120 million.

The relatively small revenues generated by a grizzly bear hunt in BC obviously do not justify such expenditures. However, in the absence of thorough population research, it is impossible for wildlife managers to ensure that the grizzly hunt is truly sustainable. Again, given the potential risk to the grizzly bear population and to a significant ecotourism industry, it would be scientifically and economically prudent to err on the side of caution and bring an end to the sport hunt.

## ECONOMIC TRANSITION

Though it is never easy to make a smooth transition between industries, the revenue and employment information and projections presented in this report suggest that a shift away from hunting is possible and, perhaps, economically efficient. To summarize, grizzly hunting activities are relatively small in the larger economic picture and, given the growth potential in grizzly bear viewing and ecotourism, revenue losses resulting from a sport hunt moratorium could likely be offset. Moreover, in the absence of such a transition, the very real possibility of a declining grizzly population could undermine both the hunting and viewing industries and result in a considerable loss of economic activity in the longer term.

Economic transition is most difficult for the individuals and families who have made their living in a particular industry for a long time. It is better, however, to undertake fair economic transition in a measured and thoughtful way than to wait until circumstances force an abrupt transition. By then, it may be too late and alternative economic options may already be lost.

While more detailed analysis and consultation would be required to make a smooth transition to a full moratorium on the grizzly sport hunt, the information gathered in this report suggests that a transition

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<sup>13</sup> Province of British Columbia, 2003, p.9.

is possible. First, in terms of government revenue, BC currently receives about \$500,000 a year from licenses, tags, and royalties associated with the grizzly bear sport hunt. A portion of this revenue, if not all, goes toward administering the sport hunt, but any revenue shortfalls net of administrative costs can likely be recouped. As grizzly viewing and other ecotourism activities grow, additional revenue will flow to the government in the form of business taxes, income taxes, and commercial backcountry recreation tenure fees.

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*While the previous grizzly sport hunt moratorium was imposed without any phase-in, a new one could be implemented with greater emphasis on economic transition.*

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Transition for the workers and businesses engaged in the grizzly hunt should also be an important consideration when looking at grizzly bear management options. First, however, it should be noted that most guide outfitters do not rely exclusively on the grizzly bear hunt for their income. While the potential to hunt a grizzly may be a significant selling point for many guide outfitters, they often bundle the grizzly hunt with other game animals. The loss of the grizzly hunt, therefore, will not likely eliminate guide outfitting businesses, but will require a shift in emphasis. Hunters will still be attracted to BC for the abundance of its game animals regardless of the grizzly hunt.

Secondly, while the previous grizzly sport hunt moratorium was imposed without any phase-in, a new one could be implemented with greater emphasis on economic transition. Depending on biological considerations, it may be possible to design a transition period during which guide outfitters could gradually reorient their business focus, advertising, and investment.

Finally, in a logistical sense, there are similarities between the grizzly viewing and grizzly hunting industries. Those guide outfitters who see the growth potential in the ecotourism/bear viewing industry could shift the nature of their business to take advantage of this emerging market.



## INDUSTRY RISK

While more biological information is needed to accurately track the population of BC's grizzly bears, there is enough evidence to suggest that the population is declining and that the grizzly sport hunt is contributing to this decline. We now live in a world where the possibility or perception of irreparable harm to species and ecosystems is enough to draw international attention as well as threats of market campaigns and boycotts. Internationally connected environmental organizations are able to mobilize action quickly and effectively. The global market campaign against Home Depot is a good example—it quickly brought about a change in their purchasing policies toward ecologically certified wood products.<sup>14</sup> More recently, a renewed international market campaign against the seal hunt threatens economic interests on the east coast of Canada.

If the grizzly bear sport hunt continues in BC, there is the distinct possibility of an international market campaign directed at BC's tourism industry. European visitors to BC tend to be especially sensitive to the hunting of grizzly bears, and are often shocked to learn that sport hunting is still permitted. A market campaign using images of dead grizzly bears could do serious and long-term damage to the tourism industry, and thus to BC's overall economic prosperity. In the absence of scientific consensus about the sustainability of the grizzly hunt, the risk of a market campaign must be considered as a real economic risk associated with an ongoing sport hunt.

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<sup>14</sup> Linden, 1999.

## ASYMMETRY BETWEEN VIEWING AND HUNTING OPERATIONS

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*Viewing operators offered consistent anecdotal evidence to suggest that the brief moratorium in 2000 had a positive effect on tour bookings and, conversely, the reintroduction of the hunt suppressed business and lead to cancellations in some cases.*

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As shown in our review of revenue data for the grizzly hunt and viewing operations, viewing is a significantly greater economic engine for the province. There is another asymmetry between the industries that needs to be taken into account: while the business success of the grizzly hunt is largely unaffected by viewing operations, the economic potential of the viewing business could be significantly impacted by a continued hunt, even in the absence of an explicit international campaign.

First there is the possibility that the hunt will decrease the grizzly bear population to a point where grizzly bear sightings become too scarce to market. However, even without declining bear numbers and in the absence of a full-scale market campaign, there is the very real image problem that the grizzly hunt brings to the province. For better or worse, perception is a dominant factor in marketing tourism opportunities. During phone interviews, viewing operators offered consistent anecdotal evidence to suggest that the brief moratorium in 2000 had a positive effect on tour bookings and, conversely, the reintroduction of the hunt suppressed business and lead to cancellations in some cases. Given the scale of the two types of operation, it makes economic sense to ensure the preservation and growth of the larger and more apparently sustainable viewing operations.

## Implications and Recommendations

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*Economic considerations would in fact tend to favour a moratorium.*

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The information and discussion presented in this report are intended to provide support for informed decisions about the future of grizzly bear management in BC. The implications of this economic information need to be taken into account—along with biological, social, and ethical considerations—in any policy discussions. Because of the myriad considerations that pertain to grizzly management, however, it is difficult to make specific recommendations based on relatively narrow economic considerations. There are, however, some broad implications that arise from the findings in this report.

Perhaps the most significant finding of this study is that economic considerations should not be used to argue against the reintroduction of a moratorium on the sport hunting of grizzly bears. Based on the available information, economic considerations would in fact tend to favour a moratorium. While population trends need more study and must play a central role in any management planning, decision makers should be careful not to undermine or foreclose the economic potential offered by the viewing of grizzly bears.

It would be prudent for the province to take a number of steps to ensure that the broadest social interests are served.

First, the government should immediately extend regional moratoria to all areas where the grizzly population is uncertain. Given the potential loss of revenue that would accompany the local extirpation of grizzly bears from their current range, managers should err on the side of caution.

At the same time, further efforts should be undertaken to better understand the size and long-term viability of the resident grizzly population. Again, the potential economic losses that could result from lack of information and from mismanagement make this an urgent issue.

Finally, provincial decision makers should, at the very least, undertake further consultations and planning around introducing a full moratorium and phasing out the grizzly sport hunt in BC. This report points out the relative scale of the grizzly hunting and viewing industries, and highlights their apparent incompatibility. From a conservative economic standpoint, it would be prudent to ensure the future of the larger and more clearly sustainable ecotourism operations.

In the meantime, further study should also be directed toward the future of the grizzly viewing industry in BC. A focused market study could more clearly reveal the potential for growth in this industry and provide further details on marketing strengths and liabilities. Ecological impacts from viewing also need further study to ensure present and future operations do not themselves jeopardize the long-term prospects for sustainability. As this information becomes better understood, government agencies should ensure that best practices are followed through regulations, codes of conduct, certification, and/or the application of market-based tools.

Further study on the economic value of grizzly bears should also be undertaken to augment the findings in this report. While the information provided here is an important first step, further information on the range of use and non-use values associated with grizzly bears would be valuable for decision makers (*see “Valuing Environmental Assets” in Appendix A for further details on possible future studies*).

## Conclusions

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*In economic terms, grizzlies may also be viewed as an indicator species—the way we approach grizzly management in BC will be indicative of the broader economic development and direction of the province.*

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Grizzly bears first became an economic resource for British Columbia in 1909 when the government introduced a \$100 fee for a general hunting license that allowed non-residents to hunt an unlimited number of black and grizzly bears. Since that time, grizzly bears have become an important attraction for both the guide outfitting and, more recently, the ecotourism industries in the province.

Right now, the future of the grizzly bear in British Columbia is uncertain. While definitive population figures are unavailable and require more research, certain trends are increasingly clear: the cumulative pressures of development including forestry, fisheries, oil and gas exploration, mining, settlement, and hunting are having a negative impact on the bear population.<sup>15</sup> Because of their low reproductive rate and large range requirements, grizzly bears are especially sensitive to development and disturbance. It is not surprising that grizzly bears are already extirpated from over half of their original habitat throughout North America.<sup>16</sup>

In ecological terms, grizzly bears are an indicator species. Because of their wide geographic range and their position atop the food chain, a decline in the grizzly population can indicate a threat to many other species and to the integrity of the ecosystem itself.

In economic terms, grizzlies may also be viewed as an indicator species—the way we approach grizzly management in BC will be indicative of the broader economic development and direction of the province. If we cannot manage a sustainable relationship with grizzly bears it may well indicate we are taking the wrong approach to economic development in a wider sense. While this report is focused on the economics surrounding grizzly bear related activity in BC, some of the broader principles may be extended to other areas of economic development in BC for the 21st century.

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<sup>15</sup> Province of British Columbia, 1995.

<sup>16</sup> *ibid*

## Appendix A—Methodological Issues

### METHODOLOGICAL BACKGROUND

The use of economic methods to inform public policy around environmental issues is a wide field with many analytical approaches. The following overview is provided as a brief context for the work undertaken in this report and as a prelude to future research.

### VALUING ENVIRONMENTAL ASSETS

The total economic value of environmental assets is comprised of two broad components: use values and non-use values. Use values derive from actual or future potential consumption of an environmental resource. Use values can accrue through the direct use and consumption of a resource (for example, logging or hunting) or through the direct non-consumptive or passive use of an environmental asset (such as the values associated with whale watching or grizzly bear viewing).

Use values also include the value people place on an environmental asset in order to have the option to use the resource in the future (i.e. option value). Option value is characterized by uncertainty with respect to the future availability of environmental assets and the fact that the loss of many environmental assets is irreversible. Other use values are distinguished by the indirect use of natural resources in a way that does not involve depleting the resource—recreation, for example.

Non-use values are associated with the values people derive from natural resources without using them either directly or indirectly. One type of non-use value is existence value, which is based on the notion that people wish to conserve or improve an environmental asset for its own sake, not only because they can get some benefit by using or preserving these assets.

A comprehensive economic analysis of grizzly bear management options would estimate the range of use and non-use values associated with grizzly bears and evaluate the incremental changes in these values

under different policy scenarios for grizzly bear management in BC. Specific analysis components could include:

- A business case evaluation of industries that earn revenue from the use of grizzly bears to determine direct economic and employment impacts;
- A travel cost study to provide a broader evaluation of the value associated with the consumptive use of grizzly bears (such as hunting) and the non-consumptive use of grizzly bears (such as viewing or other tourism/recreation related activities);
- A contingent valuation study to assess overall societal values (or consumer surplus) associated with the use and non-use of grizzly bears;
- A study of indirect economic and employment effects as they multiply through the BC and Canadian economies; and
- A study of the overall strength and sustainability of ecosystems that grizzly bears are an integral part of, or the particular role grizzlies play in these ecosystems (for example, nutrient distribution in the coastal environment).

The intent of this study is to provide an initial economic screening and scenario analysis of the direct economic benefits afforded by grizzly bears in British Columbia.

## METHODOLOGY

The analysis undertaken in this study is a first step toward understanding the potential economic and employment impacts of alternative policies for grizzly bear management in BC. First, the analysis looks at the current direct expenditures in two major industries associated with grizzly bears: guide outfitting/hunting and ecotourism/viewing. The analysis then structures reasonable assumptions about changes over time to revenues in these sectors under specific scenarios of future management policy and grizzly bear population trends. Incremental changes to revenue projections between the status quo and alternative scenarios are then examined to provide insight, implications, and guidance on the potential economic impacts of various grizzly bear management policies.

The analysis employed the following methodological steps:

1. Using a broad sample based on available information, we estimated current revenues for both guide outfitters offering grizzly bear hunting trips and ecotour operators offering grizzly bear viewing trips, given the status quo BC government policy and regulatory structure.
2. We estimated the present value and levelized annual value of revenues under a status quo management scenario by projecting the impacts on the two industries if the current management structure is continued for the next 20 years.
3. We considered the impacts on revenues of alternative scenarios that underscore different options for management of grizzly bears, or different hypotheses about grizzly bear population trends.
4. We conducted a sensitivity analysis on the discount rate to examine the impact of various discount rate assumptions.
5. Finally, we considered further analysis components that would continue to build the foundation for and inform the debate on grizzly bear management in BC.

## KEY ASSUMPTIONS

A number of key assumptions are worth noting in the context of the methodology outlined above:

- This analysis examines the direct expenditures on grizzly bear hunting and viewing. We do not consider the unpaid value (or consumer surplus) that is directly attributable to these activities.
- Given the project scope, a complete business case analysis for individual operators and outfitters cannot be completed and aggregated province-wide. Underlying cost data have not been collected. Assessing revenues based on readily available individual business information is a practical first step to understand the order of magnitude between the consumptive and non-consumptive components of grizzly bear values. It is also reasonable to assume that cost structures are similar for each industry.
- We have looked at the revenues that flow to the provincial government but have not included them in the analysis, as they are a transfer and not additional revenues that flow from grizzly bear activities. However, a portion of the revenues to guide outfitters



includes royalties collected to pay the provincial government for every grizzly bear killed.

- In this study, we did not determine provincial government management costs or government employment under different scenarios.

## DISCOUNTING

The methodology used in this study underscores the fact that the future benefits from direct use of grizzly bears will be impacted by policy decisions taken in the present. In order to properly assess the impact of alternative policies on an equal footing, we must ask the question: What is the *present value* of the direct benefits that will accrue year after year from economic activity related to grizzly bears, given the various policy options under consideration? Or conversely, what is the present value of the direct benefits of grizzly bear use activities that may be lost if management policy is not successful in ensuring the sustainability of grizzly bears and the associated activities that generate economic benefit?

These questions are important because different policies will almost certainly have different streams of future revenues and discounting these streams to the present allows alternative policies to be compared. In addition to reporting present values, this analysis also reports levelized annual values.

Under positive discounting, costs or revenues have less value if they occur in future years as opposed to if these values occur in near present years, with all else being equal. Higher discount rates, therefore, favour current use of an asset whereas lower rates favour sustaining assets into the future. A discount rate equal to 0% implies that future costs or revenues are equally as valuable as costs or revenues occurring in near present years.

In economic analysis of decisions undertaken to assess commercial value, an appropriate discount rate is the market rate for the cost of capital. However, the market rate is regarded too high for decisions affecting the sustainability or stewardship of environmental assets.

Wildlife resources can be thought of as a common property resource, managed in trust by government. Based on survey research, we know that Canadians attach considerable importance to maintaining wildlife populations for use by future generations.<sup>17</sup>

Although our analysis utilizes revenue estimates of commercial ventures as an initial starting point and proxy for the value of grizzly bears in the province, we choose a discount rate equal to 5%, reflecting public values around the stewardship and sustainability of grizzly bears.

#### DISCOUNT RATE SENSITIVITY

In order to give an idea of the sensitivity of our results to alternative discount rates, we also ran the revenue projections through discount rates of 0% and 8%. With a 0% discount rate, the present value of grizzly bear ecotourism over 20 years is about \$120 million while the present value of the grizzly bear component of guide outfitting is \$65 million. Under the moratorium scenario, viewing revenues remain at \$120 million while grizzly hunting revenues drop to zero.

By comparison, applying an 8% discount rate over the 20-year time horizon results in considerably lower present values. Under the status quo scenario, grizzly viewing ecotourism is valued at \$60 million while grizzly hunting guide outfitting is valued at \$32 million. Under the moratorium scenario, viewing values remain at \$60 million while hunting values, once again, are zero.

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<sup>17</sup> Federal-Provincial Task Force for the 1987 National Survey on the Importance of Wildlife to Canadians.

## Appendix B—Industry Overviews

For those who have not experienced a grizzly bear hunt or viewing package, the following overviews provide some greater context for the employment and revenue figures discussed in the report.

### GUIDE OUTFITTING/ GRIZZLY HUNTING

In British Columbia, grizzly hunting opportunities are offered by guide outfitters who have obtained the tenure to a given area of land. Guide outfitters often own a lodge or base camp from which the hunting trips are conducted. Sometimes the business consists only of the guide and his wife, but often they hire extra help (usually just one or two extra people) during the hunting season. Some guide outfitter operations are more elaborate set-ups, offering guiding services in season and using the lodge as a base for wilderness adventures at other times of the year.

Guests (non-resident hunters) are often Americans, and generally arrive either by car or by plane (airfare is usually not included in the price of the hunt). Grizzly hunting trips vary in length, but mostly range between one and two weeks. The cost usually includes meals and lodging. Standards at lodges are variable, some being quite basic and others offering such luxuries as saunas.

Grizzly hunts can involve hiking, horseback riding, travel by boat, air, or 4-wheel drive all-terrain vehicles. Sometimes hunts are conducted quite close to the base camp, but in larger tenure areas guides and hunters may sometimes travel further and camp out in the backcountry (or stay in a cabin if there is one). The success rate for hunters in taking home a grizzly bear trophy vary—non-resident hunters assisted by a guide average 37%.

Grizzly hunts with a guide outfitter cost around \$15,000 if a bear is actually killed. The experience is often marketed to clients as “the adventure of a lifetime,” “the ultimate hunt,” and “a pristine wilderness experience.”

#### Selected Inputs

Average number of grizzlies killed by Guide outfitters per year 80-145 last 10 years)*	116 (range: 80-145)
Average revenue per guided grizzly hunt (\$CDN)	\$7,500
Average trophy fee charged non-resident hunters (\$CDN)	\$7,500
Guide Outfitters Association of BC members offering grizzly hunts	117

\* Not including year of moratorium on hunting – 2001

## ECOTOURISM/GRIZZLY VIEWING

Grizzly viewing is an increasingly popular activity for residents and visitors to BC. Some companies offer tours specifically to watch grizzlies in their natural habitat, while other ecotourism operations offer adventures that sometimes deliver a grizzly sighting as a bonus (for example, during whitewater river rafting). The majority of commercial grizzly viewing operations in BC operate on the coast, watching the bears from the water.

One popular option for grizzly viewing is aboard a large sailboat on a multi-day excursion up the passage between Vancouver Island and the mainland. Smaller boats then take visitors into inlets to view bears. The sailboats range in size, some holding up to twenty people. Length of trip can vary as well, but usually ranges from 3-10 days. Guests sleep on board the boats along with crew, and all meals are provided. Employment for the extra help is invariably seasonal. Many of the tour operators only offer a few trips rather than running continuously throughout the season.

Another option for seeing grizzlies from the water is on one-day boat tours. These tours use water taxis to take guests into grizzly territory. Bears are viewed either from the boat, from a viewing platform on top of a safari van, or from viewing stands that have been built in places like Knight Inlet where grizzly viewing is very popular.

In the interior of BC, some tour operators offer backcountry wilderness trips that can include seeing grizzlies in the wild. However, these options are not as accessible as the boat trips and therefore do not draw the same number of people.

People are drawn to grizzly viewing for many reasons, but they all seem to revolve around the experience of seeing such a majestic and charismatic creature at home in its natural environment.

### Selected Inputs: Small-medium sized businesses \*

Average number of ecotour businesses offering grizzly bear viewing	35
Average annual revenue from bear viewing activities (\$CDN)	\$125,000
Range of revenue per trip that has a grizzly viewing component (\$CDN)	\$200–\$6,500
Average revenue per grizzly viewing day** (\$CDN)	\$400**

\* This data does not represent the profile of one large business on the BC coast with revenues equal to roughly 30% of total industry revenues.

\*\* Average revenue per grizzly viewing day is based on the average of trip costs across all sampled businesses, weighted by the length of each trip, the number of people on each trip, and the percentage of each trip devoted to grizzly bear viewing.

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